

BURNER PROBLEMS- SUMMARY

- Safety Concerns (burner line fires, structural failure^{outer registers}, etc.)
- Structural Integrity due to overheating
- Burner Line Fires
- Eyebrows/ Slagging in Burners
- Air Flow Balancing on Burners

B&W's REDESIGN APPROACH

- Tank-Up Existing Design
- HD Outer Registers
- New Throat Sleeve Assembly

REASONS FOR OUTSIDE CONSULTANT

- Originally, Alternative Testing Option (to B&W)
- Discussion always lead back to
Burner Setup, Balancing and Design Problems
- Modeling Capabilities
 - Aerodynamic Flow Models
 - Finite Element Analysis
- No Pre-Testing of B7W's Design Mods

RJM's BACKGROUND

- Background
- LADWP- Haynes Station Testing
- B&W Recent Interface
 - So Cal Edison
 - Public Service of Oklahoma

B&W BURNER SETUP/ DESIGN PROBLEMS

- Setup Problems
Causing majority overheat conditions
- Overswirl Conditions (dynamic factors)
Contributing to burner line fires/slugging
- Poor Design (unprotected surfaces)
Overheating on radiant surfaces
- Burner Not Sufficiently Balanced (Air and Fuel Flow)

IMPACT

- Cancel Recommendation on 2 Point Outer Register Positioning

(Overswirl Flame Profile- overhead)

Flame Stabilizer- overhead

SOLUTIONS

- Axisymmetric 2-D Model

- Determine Outer Register Door Positioning (Swirl # < .3)

- Determine Inner Register Vane Positioning (Swirl # > .6)

- Maintain Total Burner Swirl # = .3

- Coal Flame Stabilizer

- Swirl # = .8

- Optimize Burner Design

- Conduct Burner Design Evaluation

- Detail Swirler Design

- Compute Aerodynamic Model

- Conduct Finite Element Analysis

Photo Swirler- overhead

Good Flame Profile- overhead

SECONDARY AIR FLOW BALANCING

OBJECTIVES:

- O₂/CO Profiles
- LOI Profiles
- Flame Scanner Improvement

SOLUTIONS:

- 3-D Fluid Dynamic Modeling
- Air Distribution Analysis
- Air Flow Balancing
- Fuel Flow Analysis
- Fuel Flow Balancing

3-D Flow Examples- overheads

RECOMMENDATIONS

· Utilize RJM as Burner Design Consultant

1. Burner Design Review	
Outer Air Register	
Materials	
Outer Air Sleeve	
2. Conduct Finite Element Analysis	
	\$27,000
3. Coal Flame Stabilizer	
	\$7,200
4. 2- D Aerodynamic Flow Modeling	
	\$9,000
Total	\$43,200
10-12 Week Turnaround	

Phase 2

1. Swirlers	
	\$86,400
2. 3-D Aerodynamic Modeling	
	\$76,000
Total	\$162,400

Phase 3

1. Testing & Balancing	
	\$40,000
Total	\$40,000

CONTRACTUAL CONCERNS

- B&W - RJM working interface
Preference RJM Working thru IPSC
- Funding
IPSC- Outside Services (not budgeted)
Capital Project (sub- contract under B&W)
- Time Schedule
10-12 Weeks for RJM Evaluation
Outage Extension for Testing
- Warranty Considerations
Duration (if any)
B&W ?
- Guarantee's
NOx